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EVALUATION OF TEXTILES PROPOSED FOR SPACECRAFT CREW APPAREL

Final Report

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(NASA-CF-147714) EVALUATION OF TEXTILES
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PURPOSE OF STUDY:

Evaluation of textiles proposed for spacecraft wearing apparel for possible primary irritancy and allergenicity.

Three materials were submitted for testing; 1. Blue, loosely knit fabric of a copolymer of chlorotrifluoroethylene and ethylene (CTFE), 2. White fabric, 100% cotton double knit, treated with fire retardant THPOH/NH³ [Tetrakis (hydroxymethyl) phosphonium hydroxide/ammonia], 3. Gold colored polyimide fabric. All materials were tested in a similar manner.

ANIMAL STUDIES:

Four adult guinea pigs were used as study animals for each fabric. 4 x 4 cm patches of textile were wetted with 10% sodium lauryl sulfate and applied to the depilated back or flank under a piece of Saran Wrap and secured in position with elastic adhesive tape (Elastoplast). Patches were left in place for a period of 48 hours and then removed for a period of 24 hours following which they were reapplied. The procedure involved five forty-eight hour exposures with one day intervals of rest. The areas of testing became progressively inflamed with each sodium lauryl sulfate exposure however frank ulceration did not occur.

Challenge test: 4 x 4 cm square pieces of material were wetted with tap water and applied under Saran Wrap and secured in place with elastic adhesive tape. These were left in place for 48 hours.

Results: There were no reactions at any of the sites from any of the three fabrics. The blue knitted material deposited a considerable

amount of blue color on the animals when wetted with sodium lauryl sulfate. The color loss was minimal following wetting with tap water.

HUMAN STUDY:

One hundred volunteer subjects were utilized to evaluate the allergenicity of the materials in humans. The three materials were tested simultaneously. 4 x 4 cm square patches of material wetted with 10% sodium lauryl sulfate, were placed under an occlusive adhesive tape (Blenderm) and left in place for 48 hours. The patches were then removed for a period of 24 hours. Identical patches wetted with 10% sodium lauryl sulfate were replaced at the same sites and again left in place for 48 hours.

Challenge test: Two weeks later the men were challenged with identical patches of material wetted with tap water. Patches were secured in place with occlusive dressings and left in place for 48 hours.

Results: There were no reactions to any of the materials.

CONCLUSION:

There were no reactions of the primary irritant type or allergic type to any of the three materials submitted for testing in either the guinea pigs or human subjects. They appear to be safe and I would recommend they be made into suitable garments for usage testing. A significant and annoying color loss from the blue fabric was noted when wetted with sodium lauryl sulfate.